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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations November-2021

DIGITAL LOGIC DESIGN

(Common to CSE & CSIT)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1 Reduce the following Boolean Expressions to the indicated number of literals:

- | | | |
|---|-----------|-----------|
| a $A'C'+ABC+AC'+AB$ to three literals. | L6 | 4M |
| b $(X'Y'+Z)'+Z+XY+WZ$ to three literals. | L6 | 4M |
| c $A'B(D'+C'D)+B(A+A'CD)$ to one literal. | L6 | 4M |

OR

2 a Convert the following numbers

L5 6M

- i) $(41.6875)_{10}$ to Hexadecimal number
ii) $(11001101.0101)_2$ to base-8 and base-4

b Subtract $(111001)_2$ from (101011) using 2's complement?

L5 6M

UNIT-II

3 a Design the circuit by Using NAND gates

L6 6M

$$F = ABC' + DE + AB'D'$$

b Design the circuit by Using NOR gates

L6 6M

$$F = (X+Y).(X'+Y'+Z')$$

OR

4 Simplify the Boolean expression using K-map?

L6 12M

$$F(A,B,C,D,E) = \sum m(0,1,4,5,16,17,21,25,29)$$

UNIT-III

5 a Explain about Binary Half Adder?

L2 6M

b Implement the following Boolean function using 8:1 multiplexer

L5 6M

$$F(A, B, C, D) = A'BD' + ACD + A'C'D + B'CD$$

OR

6 a Design a 4 bit binary parallel subtractor and the explain operation in detail?

L5 6M

b What is combinational circuits and explain analysis and design procedure of combinational circuits

L1 6M

UNIT-IV

7 a Explain the Logic diagram of JK flip-flop?

L2 6M

b Explain about ripple counter?

L2 6M

OR

8 Explain the design of a 4 bit binary counter with parallel load in detail?

L2 12M

UNIT-V

- 9 Design a Combinational circuit using PAL by considering the following Boolean Functions given in sum of min terms:

L5 12M

$$W(A,B,C,D)=\Sigma M(2,12,13)$$

$$X(A,B,C,D)=\Sigma m(7,8,9,10,11,12,13,14,15)$$

$$Y(A,B,C,D)=\Sigma(0,2,3,4,5,6,7,8,10,11,15)$$

$$Z(A,B,C,D)=\Sigma(1,2,8,12,13)$$

OR

- 10 a What is ROM? List the different types of ROMs.

L1 6M

- b Implement following Boolean functions using PLA

L5 6M

$$F1(A,B,C)=\Sigma m(0,1,3,5) \text{ and } F2(A,B,C)=\Sigma m(0,3,5,7)$$

*** END ***